RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Log Event A

Borehole 51-04-12

Borehole Information

Farm : TX	**Tank :** TX-104	**Site Number :** 299-W15-129
N-Coord : 41,698	**W-Coord :** 76,052	**TOC Elevation :** 670.69
Water Level, ft :	**Date Drilled :** 11/23/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled in November 1971 and completed to a depth of 100 ft. The 6-in. casing in the borehole is assumed to be schedule-40, carbon-steel tubing with a wall thickness of 0.280 in. The drilling log does not mention if casing perforations or grout were installed. The top of the borehole casing is assumed to be even with the ground surface. The SGLS was able to reach a depth of 100.5 ft.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 4/9/1996	**Logging Engineer:** Mike Widdop
Start Depth, ft.: 100.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 60.5	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 4/10/1996	**Logging Engineer:** Mike Widdop
Start Depth, ft.: 61.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 0.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787 Analysis Date : 8/15/1996

Analysis Notes :

The logging of this borehole was completed using the SGLS in two logging runs. The field verification spectra recorded immediately before and after the survey operation met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

A depth overlap, where data was collected by separate logging runs at the same depth, occurred in this borehole between 60.5 and 61.5 ft. The KUT concentrations were calculated using both the original and repeated log data sets at the overlapping points. The calculated concentrations using the two separate data sets were within the statistical uncertainty of the measurements, indicating very good repeatability of the radionuclide concentration measurements.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected continuously from the ground surface to 14 ft, at five locations between depths of 14 ft and 31 ft, and in one measurement at the bottom of the borehole. From 1 to 6.5 ft, there is a broad peak where the Cs-137 concentration values range from about 10 to 30 pCi/g. Below 8 ft, all the values are less than 2 pCi/g. Cs-137 concentrations were not detected between 31.5 and 100 ft in this borehole.

The K-40 concentration log has a gradual increase at 48 ft from a mean of about 12 to 19 pCi/g. The U-238 and Th-232 log plots also have a slight increase in mean value at this depth.

The SGLS total count log plot has a strong zone of high counts between 1 and 7.5 ft that exactly mimics the shape of the plot of Cs-137 concentrations.

Details regarding the interpretation of the data for this borehole are presented in the Tank Summary Data Reports for tanks TX-104 and TX-108.

Log Plot Notes:

Separate log plots show the concentrations of the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithologic interpretations. The headings of these plots identify the energy peak for the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The MDL is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and naturally occurring radionuclides, the total gamma count derived from the SGLS, and the Tank Farms gross gamma log. No attempt was made to adjust the depths to coincide with the SGLS data.